

Plant Health Programs:

Combining Surveillance, Detection, and Response



The Animal and Plant Health Inspection Service (APHIS) is charged with protecting American agriculture in part by setting phytosanitary and zoosanitary standards that allow trade without the threat of introducing foreign pests and diseases into the United States or pests and diseases that are indigenous in the United States into foreign countries. APHIS' Plant Protection and Quarantine (PPQ) program focuses on phytosanitary issues and standards.

In August 1999, the pink hibiscus mealybug was discovered in two communities along the United States–Mexican border. The pest had affected plants in the urban areas of Calexico and El Centro, CA.

The pink hibiscus mealybug is a serious agricultural pest that attacks more than 200 plants, including fruits, vegetables, and ornamentals. The pest sucks the juice from host plants while simultaneously injecting its saliva, which is toxic. This action leads to malformation of leaves and fruit and sometimes to the death of the plant. If it were to become established here, the pest could cause more than \$750 million in damage to U.S. agriculture annually.

The pink hibiscus mealybug is established in central and northern Africa, India, Pakistan, northern Australia, and southeastern Asia. This mealybug arrived in Grenada in 1994 and spread to 14 other Caribbean nations. In 1996, U.S. Department of Agriculture (USDA) scientists anticipated the mealybug's spreading to the continental United States and began working on a biological control program on several Caribbean islands.

The research led to the discovery of natural enemies of the mealybug: a microscopic, stingless wasp, native to China and Egypt, which lays eggs inside the body of the mealybug. The eggs hatch into maggotlike larvae that kill the mealybug by feeding on its internal organs. The wasps have successfully controlled pink hibiscus mealybug in Egypt, India, China, Australia, and Hawaii. USDA's APHIS released the wasps on St. Kitts, an effort that resulted in a 94-percent reduction of the mealybug population density in less than 2 years.

So when pink hibiscus mealybug was found in the United States in 1999, APHIS had a history of combating the pest and was prepared to release the parasitic wasps. Within 3 weeks of the first find in California, the wasps went to work fighting the pink hibiscus mealybug infestation.

The pink hibiscus mealybug project is just one example of APHIS in action. By constant surveillance and preparation, APHIS' PPQ program is ready to respond to plant pest and disease outbreaks across the United States without delay. PPQ's quick response prevents infestations from becoming large-scale problems that could affect U.S. trade and devastate U.S. agriculture.

PPQ responds to foreign pest threats by using an integrated approach that combines surveillance, detection, response, and research. By using these elements, PPQ works every day to safeguard U.S. agriculture, especially plant resources.

The integrated approach used by APHIS PPQ to combat plant pests and diseases has global benefits. U.S. trading partners can trust that they are receiving healthy, pest- and disease-free agricultural shipments, while U.S. consumers can continue to enjoy the tastes of America and the world.

PPQ's personnel are the vital link among the elements of PPQ's integrated approach. The unit's approximately 3,500 employees represent a wide variety of academic disciplines and are a highly educated and skilled work force. Plant pathology, entomology, botany, weed science, ecology, zoology, veterinary science, biotechnology, computer science, statistics, and management are only some of the areas PPQ employees specialize in. The majority of PPQ employees hold college degrees, and many have advanced degrees in the sciences. PPQ employees work all over the United States and in a number of other countries. Management and staff specialists work at APHIS headquarters offices in and near Washington, DC, as well as at PPQ's Center for Plant Health Science and Technology (CPHST) in Raleigh, NC. PPQ also has offices in all 50 States where personnel concentrate on local issues.

Surveillance and Detection

One reason PPQ was ready for the pink hibiscus mealybug in California was because PPQ constantly monitored the species' progress in the Caribbean. By working together with the various governments in the Caribbean, APHIS was able to track the pest and, in turn, strategically release the parasitic wasp. APHIS uses similar approaches to guard the country's borders from pests in other areas of the world that could threaten U.S. agriculture.

Another example of international monitoring is the Moscamed program. Designed to reduce the risk of Mediterranean fruit fly (Medfly) introduction into the United States, Moscamed is a cooperative program between the governments of the United States, Mexico, and Guatemala. The program, initiated in 1977 and managed by APHIS' International Services (IS) program, works to eradicate the Medfly from Mexico and to maintain a barrier in Guatemala to halt the Medfly's northern spread.

PPQ also has programs that monitor and manage established plant pests like boll weevil and gypsy moth and certain noxious weeds of foreign origin. To monitor plant pests, PPQ works with the States in a project called the Cooperative Agricultural Pest Survey (CAPS). Survey information on insects and plant diseases is entered into a nationwide database, the National Agricultural Pest Information System (NAPIS). Information from this database can be accessed from anywhere in the country by persons with an authorized account. PPQ has also used the CAPS program to conduct ongoing surveys for foreign plant pests and diseases, such as the Asian longhorned beetle and plum pox.

By accessing NAPIS, users can retrieve the latest collected data on pests. NAPIS data can assist in pest forecasting, early pest warning, quicker and more precise delimiting efforts, and better planning of plant pest eradication or control efforts. Survey data—which can reflect the absence as well as the presence of pests—also help U.S. exports by assuring foreign countries that our commodities are free of specific pests and diseases. More than a million records are in the NAPIS database. About 200 Federal and State agencies use NAPIS. Its data can be downloaded and analyzed with geographic information systems to provide graphic representation of information.

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Response

No matter how effectively PPQ inspectors deal with incoming international passengers, mail, and cargo, occasionally an exotic pest or disease gets into the country. PPQ has the ability to take immediate action to protect U.S. plant and animal resources by first containing and if possible eradicating the pest or disease and by allaying fears of our trading partners and the public about the health of U.S. agriculture.

The work of the Rapid Response Teams is supported by the most recent science and research coordinated or sponsored by PPQ..

PPQ's Rapid Response Teams can quickly react to any outbreak of diseases or pests within the United States. When the pink hibiscus mealybug was detected in California, a Rapid Response Team was prepared to handle the situation. These groups have been mobilized on other occasions to combat costly infestations of the Asian long-horned beetle and Medfly. Rapid Response Teams also swung into action when the destructive "A" strain of citrus canker was found in Florida orange groves, plum pox was detected in Pennsylvania, and when Karnal bunt, a fungal disease of wheat, was discovered in Arizona.

These teams work in concert with local and State officials to assess the situation and develop a strategy to determine the extent of infestations and to eradicate the pest or disease. Sometimes the approach is as basic as removing the host material and trapping associated insects at the infestation site. At other times, PPQ employs more sophisticated methods like the use of federally approved pesticides in limited spray programs or the breeding and release of sterilized insects to suppress pest populations. PPQ always looks for the safest and most effective and environmentally responsible strategy in these situations.

Methods Development

The work of the Rapid Response Teams is supported by the most recent science and research coordinated or sponsored by PPQ. Methods and policies developed for use in an emergency outbreak situation must be environmentally acceptable and in compliance with Federal, State, and local laws such as those governing pesticide use and notification to enter or treat private property. A Medfly find or outbreak of Karnal bunt has potential to excite concern among our trading partners, who need to be reassured that U.S. commodities will not introduce pests or diseases into their ecosystems. Emergency response methods must ensure continued access for U.S. agricultural exports into foreign markets.

Scientific information and results from our methods development work are gathered through CPHST. The Center, with headquarters in Raleigh, NC, serves as the umbrella organization for PPQ labs and plant protection centers and the National Biological Control Institute. The Center's multidisciplinary staff concentrates on analyzing scientific and technical elements of plant protection programs and systems and identifying needs and appropriate ways to meet present and future phytosanitary challenges. PPQ forges collaborative working partnerships with Federal and State agencies, academic institutions, and the private sector to accomplish its work.

PPQ carries out methods development to adapt research findings into operational program activities at 10 different field stations known as plant protection centers. These field stations are located at Edinburg, TX, Gulfport and Starkville, MS, Gainesville and Miami, FL, Waimanalo, HI, Otis Air National Guard Base (Cape Cod), MA, Phoenix, AZ, and Oxford, NC. There is one PPQ methods group working outside the country, in association with the Moscamed program in Guatemala. PPQ also works collaboratively on international research projects in China, Caribbean countries, Mexico, Canada, countries in Africa and Europe, and India. It also collaborates with international organizations such as the North American Plant Protection Organization and other cooperators or trading partners. New pest advisory groups, science panels, and other ad hoc teams are formed by CPHST to respond to new pest finds, evaluate scientific information, and coordinate large-scale or unique risk assessments.

PPQ remains vigilant in its efforts to protect U.S. agriculture against foreign pests and diseases. At ports of entry, laboratories, and out in the field, PPQ employees are hard at work every day to respond to foreign pest threats and control or eradicate existing outbreaks. By safeguarding American plant resources, PPQ touches the lives of all Americans and people around the world.

For more information about APHIS programs, visit the APHIS homepage at <http://www.aphis.usda.gov>



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